

**Homework #15****Due Wednesday, November 3rd** in Gradescope by 11:59 pm ET

**Goal:** Exploring Power Series, mainly the Interval and Radius of Convergence. Also beginning to explore the relationship between Power Series and Functions.

Determine the Interval and Radius of Convergence for each of the following Power Series.

1. 
$$\sum_{n=0}^{\infty} \frac{x^n}{n!}$$

2. 
$$\sum_{n=1}^{\infty} \frac{x^n}{n^4 \cdot 4^n}$$

3. 
$$\sum_{n=1}^{\infty} n! \ln n (x - 6)^n$$

4. 
$$\sum_{n=1}^{\infty} \frac{(-1)^n (9x - 4)^n}{n^8 \cdot 5^n}$$

5. 
$$\sum_{n=0}^{\infty} (3n)! (2x - 1)^n$$

6. 
$$\sum_{n=1}^{\infty} \frac{(-1)^n (6x + 1)^n}{(6n + 1) \cdot 7^n}$$

7. 
$$\sum_{n=0}^{\infty} \frac{(-1)^n x^{2n}}{(2n)!}$$

8. 
$$\sum_{n=1}^{\infty} \frac{(-1)^{n+1} (3x - 5)^n}{(n + 6)^2 \cdot 7^{n+1}}$$

9. 
$$\sum_{n=1}^{\infty} \frac{(-1)^n (n + 1) (5x + 1)^n}{n^2 \cdot 9^n}$$

Find the Power Series Representation for the following functions and determine the Interval of Convergence.

10. 
$$f(x) = \frac{1}{1 + x}$$

11. 
$$f(x) = \frac{5}{1 - 4x}$$

12. 
$$f(x) = \frac{1}{3 - x}$$

# REGULAR OFFICE HOURS

**Monday: 1:00–3:00 pm**

9–10:30 pm TA Mia, SMUDD 207

**Tuesday: 12:00–4:00 pm**

6–7:30 pm TA Ian, SMUDD 207

7:30–9:00 pm TA Karime, SMUDD 207

**Wednesday: 1:00–3:00 pm**

6–7:30 pm TA Ian, SMUDD 207

7:30–9:00 pm TA Daksha, SMUDD 207

**Thursday: none for Professor**

1–2:30 pm TA Mia, SMUDD 207

7:30–9:00 pm TA Daksha, SMUDD 207

**Friday: 12:00–2:00 pm**

2:30–4:00 pm TA Karime, SMUDD 014\*\*

Time for a refreshed commitment to the course for a strong finish.